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Mr. Clay Rodgers, Assistant Executive Officer
California Regional Water Quality Control Board
1685 E Street
Fresno, CA 93706

TENTATIVE WASTE DISCHARGE REQUIREMENTS ORDER FOR E. & J. GALLO WINERY, FRESNO WINERY, FRESNO COUNTY

This letter transmits additional comments on the subject tentative order for the discharge of waste to land from the winery at 5610 East Olive Avenue in Fresno County owned and operated by E. & J. Gallo Winery (Gallo). I request that staff accept my additional comments in their processing this tentative order for Regional Board consideration.

The tentative order does not address the issue of soil buffering capacity. Gallo's 2012 Report of Waste Discharge (RWD) prepared by Kennedy/Jenks Consultants (KJC) contains data (Tables 10 and 11) of the quality of stillage and general process wastewater treated in Gallo's Fresno Anaerobic Treatment System (FATS) and the quality of untreated crusher/press wastewater. The RWD provides eight pH values for FATS effluent for 17 February 2011 that range from 6.69 to 8.25, and 15 pH values for crusher/press wastewater that range from 3.9 to 8.2 (almost half of these values are below 5.0). Discharges of acidic waste can exhaust the soil's buffering capacity, and cause soil pH to decrease to levels that are detrimental to biological soil treatment processes (e.g., denitrification).

The 2011 technical report, *Phase 1 Investigation Work Plan, E. & J. Gallo Winery, Fresno Winery,* by KJC, contains shallow sampling data collected in 2010 for the purpose of evaluating whether soils in several wastewater application area blocks are conducive for vineyard cultivation. This sampling effort involved advancing 35 soil borings and collecting soil samples at one, three, and five feet below ground surface at a density of about one sample per ten acres. Soil samples were analyzed for a suite of agronomic constituents, including pH and buffer pH. The 2010 soil sampling effort far exceeds that required by Gallo's existing Waste Discharge Requirements (WDRs) Order 94-103, and the resulting data provide a wealth of information regarding soil quality. For example, the data show several samples with low pH (below 5.5), especially in Block 18, which in the past had received discharges of acidic ion exchange regenerant solution. Other blocks that exhibited low pH in soil samples include Blocks 2, 3, 8, 13, 10 (eastern half), 14, and 19. The tentative order should address this issue given the acidity of crusher/press wastewater and evidence that soils in Gallo's Land Application Area (LAA) have low pH.

Recommendation 1. Revise the tentative order to include Finding 55 from Waste Discharge Requirements Order R5-2012-0103 for Constellation Brands U.S. Operations, Inc. dba Woodbridge Winery, Woodbridge Winery, San Joaquin County:

> Acidic and/or reducing soil conditions can be detrimental to land treatment system function, and may cause groundwater degradation if the buffering capacity of the soil is exceeded. If soil pH decreases below 5 and the soil remains in a reducing state for prolonged periods, naturally occurring metals (including iron and manganese) could dissolve and degrade underlying

> groundwater. In practice, prolonged reducing conditions may not occur because: a) the annual cycle of lowered pH during loading with either wastewater or fertilizer is followed by pH recovery during cropping and organic matter cycling and, b) the dose and rest cycling for wastewater application either in spreading basins or using irrigation creates alternate anoxic and aerobic conditions. *Pollution Abatement* recommends that water applied to crops have a pH within 6.4 to 8.4 to protect crops. The soils and underlying groundwater are expected to adequately buffer the discharge.

Also, revise the tentative order to include Land Discharge Specification D.11 from WDRs Order R5-2012-0103:

> The resulting effect of the wastewater discharge on the soil pH shall not exceed the buffering capacity of the soil profile and shall not cause significant mobilization of soil constituents such as iron and manganese.

Land Application Area Specification D.2 of the tentative order, which requires the application of waste constituents not exceed reasonable agronomic rates, does not identify the nitrogen loading from applied supplemental water and nitrogen loading from residual nitrogen in LAA soils.

Recommendation 2. Revise Land Application Area Specification D.2 as follows:

> Application of waste constituents to the land application areas shall be at reasonable agronomic rates to preclude creation of a nuisance and unreasonable degradation of groundwater, considering the crop, soil, climate, and irrigation management system. The annual nutritive loading of the land application areas, including the nutritive value of organic and chemical fertilizers and of the wastewater ***and nutrients in applied supplemental irrigation water and available in the root zone*** shall not exceed the annual crop demand.

I hope that management is supportive of staff's efforts to require Gallo to expand its groundwater monitoring well network, as there are significant data gaps that must be filled in order to better understand this discharge and its impacts (and threatened impacts) to groundwater. For example, there are no wells in the vicinity of active crusher/press wastewater application blocks (15, 16, 17, and 19). At least one additional background well should be installed to the south of MW-2, which is influenced by the recharge of high quality surface water.

My remaining comments pertain to the tentative order's Monitoring and Reporting Program (MRP).

The MRP requires monitoring of four production wells (PW-5 through PW-8). According to RWD's Figure 3, Site Layout, Gallo has three more production wells within the Winery Facility and another one immediately north of Block 15.

Recommendation 3. Revise the MRP to include PW-1 through PW-4 as monitoring locations and require monitoring in the same way as PW-5 through PW-8. This monitoring will provide critical data on the nature and vertical extent of groundwater impacts caused by Gallo's discharge.

Data provided in the RWD on FATS effluent quality (Table 10) shows occasional spikes in EC (up to 6,700 umhos/cm), sodium (up to 541 mg/L), potassium (up to 1,420 mg/L), and sulfate (up to 2,379 mg/L). The sampling frequency depicted in Table 10 (five to six times monthly) exceeds that

proposed in the tentative MRP, which only requires twice monthly sampling of FATS effluent. In order to collect data on the quality of FATS effluent when it exhibits high salinity, the tentative MRP should require continuous monitoring of EC and require 24-hour composite samples be collected and analyzed any time effluent EC exceeds 3,000 umhos/cm. The resulting data could be used by Gallo to identify high saline waste streams and evaluate industrial practices that generate high saline wastestreams with the goal of reducing the overall salinity in FATS effluent.

Recommendation 4. Revise the tentative MRP to require continuous EC monitoring of FATS effluent and to require FATS effluent sampling (via 24-hour composite) whenever effluent EC exceeds 3,000 umhos/cm. Include a footnote indicating that the trigger EC may be revised or removed by Executive Officer written approval following the receipt of technical information by the Discharger demonstrating that a proposed change (e.g., increasing the trigger EC value) is appropriate and reasonable.

The tentative MRP only requires FATS effluent to be monitored quarterly for general minerals and monthly for crusher/press wastewater. Given the high salinity of the discharge, it is appropriate for the MRP to require more frequent monitoring of FATS effluent and crusher/press wastewater for salinity constituents of winery origin, namely sodium, potassium, and sulfate. These three constituents should be monitored twice monthly in FATS effluent and in crusher/press wastewater.

Recommendation 5. Revise the tentative MRP to require twice monthly monitoring of FATS effluent and of Crusher/Press Wastewater for sodium, potassium, and sulfate.

The tentative MRP does not include total organic carbon as a groundwater monitoring constituent. This is an extremely useful groundwater constituent for evaluating the extent to which applied BOD attenuates in the vadose zone.

Recommendation 6. Revise the tentative MRP to include total organic carbon in the suite of groundwater constituents monitored quarterly.

The tentative MRP, Land Application Area Monitoring, does not include rest interval for areas receiving wastewater applications. This is a necessary parameter to evaluate Gallo's compliance with the tentative order's BOD loading limit of 250 lbs/ac/day on a cycle average. Accurate estimates of BOD loading for flood-irrigated LAA blocks are more challenging to derive than estimates for sprinkler-irrigated blocks. Each LAA block needs to be further divided into individual checks (or vineyard rows) to allow operators to document which checks (or rows) within individual blocks receive wastewater applications. As I recall, Hilmar Cheese Company prepares its wastewater application data for individual checks within wastewater application area blocks and this information facilitates staff's evaluation of the discharge for compliance with BOD loading limits.

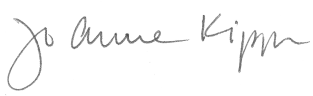
Recommendation 7. Revise the tentative MRP to require Gallo to submit a map (or maps) of individual LAA blocks depicting the locations of individual checks or vineyard rows, and enumerating these checks/rows. Gallo should provide data for individual checks/rows on wastewater applications and rest intervals, as well as derived BOD loading rates. Also, change "Salt Loading" to Fixed Dissolved Solids (FDS) loading, and add annual Potassium Loading.

The tentative MRP requires annual monitoring of LAA soils and of two areas representing background soil conditions (uninfluenced from concentrated sources of waste constituents). The current MRP also requires two background locations. For several years, Gallo did not monitor background soil locations, but resumed after being reminded to do so by staff. In any event, Gallo had monitored background soils in a small parcel in the northeast corner of Block 1, and the resulting soil monitoring data identify these samples as "Background North." I examined Google Earth images of the small parcel in Block 1 (36°46'17.70" N 119°41'28.47" W) from 1998 to present and determined that it was graded and incorporated into Block 1 sometime after 24 September 2009 and before 25 April 2011. Even though this soil sampling location is within an active LAA, Gallo's monitoring reports even up to last year identify these samples as "Background North." I encourage staff to employ Google Earth to examine the soil sample locations proposed by Gallo, especially proposed background locations.

The tentative MRP's Vadose Zone Monitoring only requires monitoring of pH, EC, and BOD. And, the tentative order only requires vadose zone monitoring in blocks receiving BOD loadings exceeding 150 lbs/ac/day.

Recommendation 8. The vadose zone monitoring program should include all LAA blocks that are double-cropped, as these blocks will receive the majority of the waste constituent loadings. And, soil pore liquid should also be monitored for nitrate, ammonia, and TKN, as well as for total organic carbon (as well as or in lieu of BOD), for the following reasons: (1) nitrogen in FATS effluent is predominately in the ammonia form, and vadose zone monitoring will provide critical data to evaluate the extent to which applied nitrogen is leached from the root zone; (2) Gallo's discharge has polluted groundwater from nitrate, and data on the forms of nitrogen in soil pore liquid are critical for evaluating the extent to which current nitrogen loadings are protective of groundwater; and (3) total organic carbon requires a smaller sample volume than BOD.

I appreciate the opportunity to submit these comments.



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